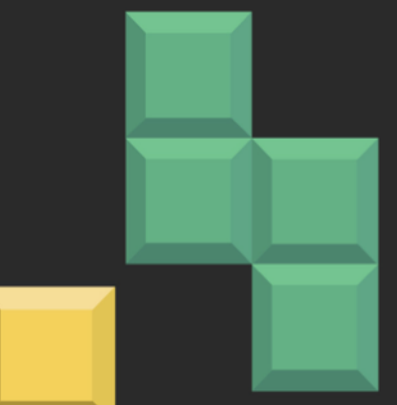




# THE PARTS OF A WHOLE



**Lodovico Bernardi,  
Bedeschi, Italy,**  
divulges details on  
how individual parts  
help shiploading and  
unloading projects  
around the world.

**W**ith a history in bulk handling, Bedeschi's focus stretches to a range of commodities, including grain and oilseed. This includes the production of a range of stackers, reclaimers, shiploaders, shipunloaders, rubber belt conveyors (either traditional or pipe) and the capacity to combine a range of equipment with components provided by others to create integrated bulk handling systems. In particular, port equipment has pulled particular focus recently, with a number of installations for the cement and fertilizer industries. These include four shiploaders installed with Yara Group globally, and over 25 references for transshipment units for materials ranging from coal to iron ore.

## Case study: Adelaide Port, Australia

An example is the shiploader designed, engineered, built and commissioned for Cargill facility at Adelaide Port in Australia.

It is a complete pre-processing mobile unit rather than a conventional shiploader, featuring a double track drive over hopper, grains sampling, weighing and scalping able to load ships up to panamax size at a capacity of 1000 tph on grain and oilseeds.

The machine moves on rubber tires and is fully independent thanks to a diesel generator able to power the equipment for up to 20 hours without refuelling at peak performance.



Figure 1. Cargill shiploader in erection phase.



Figure 2. Cargill shiploader rubber tyres.



Figure 3. Ceral Docks shipunloader.

From a structural and electrical point of view, the system was designed to fully meet Australian standards and Cargill's best practices rules. For instance, to comply with Cargill's safety requirements, instead of using the traditional bucket elevators, Bedeschi designed a special version of its chain elevator (normally applied to ship unloading) which granted superior safety and dust tight operations.

With the application of a known technology in a completely different scenario, the company also provided a solution to the very narrow quay available, which would have allowed for loading only small barges and use only a single machine that would have required several individual pieces of equipment with large decrease in operational efficiency.

The drive over a hopper is a special application of Kilic Engineering equipment and is able to receive grain simultaneously from two separate tracks, suspended on a dedicated steel rope system to quickly move the shiploader into position.

Coarser impurities or foreign objects are removed from the product stream by two Cimbria drum separators. Rejects are brought to a big bag conveniently located on the ground and easily removable for disposing.

A Mettler Toledo legal belt weighing system, with a precision of 0.5%, monitors the flow on the material. A dedicated sampling room has been positioned on the lower level to store and manage all samples according to the latest Australian regulations.

All material transfer points are aspirated to control dust emissions. Five Donaldson air treatment units have been installed for this purpose and help meet one of the most important goals of this new shiploader: effective dust control.

A shuttle type boom grants perfect hold trimming, minimising the need of downtime for the machine repositioning and granting the achievement of the highest net loading rate possible, with a concern for the environment in which the machine will be operating.

A Cleveland Cascade telescopic spout with ceramic liner and dedicated aspiration system grants minimal dust emissions, a longer equipment efficiency and gentle handling of any material.

The travelling system is engineered to provide a comprehensive solution to the existing quay's low strength and to maximise the ship loading efficiency. 14 twin wheels boogies, all steering, grant manoeuvrability and allow the shiploader to translate in any direction as well as pivoting the machine around its rotation centre. When the machine will not operate, it can be moved to a dedicated parking area designed to tie down the machine during storms and provide for maintenance and cleaning.

To overcome the restrictions on the quay and the lack of space that makes a conventional erection impossible, the shiploader was delivered fully assembled and pre-tested. Although this system can be more expensive in comparison to site erection, the solution has been recently provided by the company for many different projects around the world for the following reasons:

- Frequent quay unavailability.
- Pre-testing all the main systems before the machine is delivered, to minimise commissioning period.
- To keep the quay busy for many months of the erection phase.

Each sub system of the machine (chain elevators, rubber tires mounting etc.) had been already used and realised by Bedeschi in other projects. The integration of third party components or equipment is aimed to answer customers' demands in terms of performance but also to grant smoother operations and maintenance as well as closest support to their daily work regardless where the machine will be installed.

The company has been diversifying its line of equipment over time, as well as developing its capacity to operate worldwide. Acquisition of companies and market expansion have created a network of branches and subsidiaries active in the US, Russia and India that fully support the company's activity around the world. Some recent relevant projects include:

- Cereal Docks, Marghera Port, Italy: A rail mounted, combined shipunloader for soya beans, 800 tph on ships up panamax size and shiploader for oil extraction byproducts at 300 tph on barges. The machine was delivered to quay fully erected. Unloading system features chain elevator technology.
- Cargill West Wego, New Orleans, USA: a shuttle type fixed shiploader for grains and oilseeds, operating at 2200 tph on ship up to panamax size. This project

is a retrofit on an existing loading facility on the Mississippi River where the entire enclosed belt conveyors line which was feeding the equipment has been replaced. The manufacturing and erection, provided by Bedeschi, foresee the assembly at site of large pre-fabricated components of the machine transported from the manufacturing site to the quay by a river pontoon.

- Renova, Rosario, Argentina: this is the largest pipe conveyor for grains built so far, covering an overall length of 700 m at a capacity of 1500 tph. This kind of conveyor features a completely enclosed belt forming a pipe. It is dust tight and needs very light supporting structures. Only a 500 mm dia. is necessary for the company to reach full capacity. It can provide an unparalleled lay out flexibility eliminating the need for intermediate towers on long lengths being able to bend and overcome level changes matching terrain contour.

## Conclusion

The collaboration with customers operating with different materials and the company's willingness to test the unloading technology and chain elevator are currently applying to grains and meals, as well as products such as clinker, coal and fertilizers. The test phase is currently ongoing and soon the company will be in the position to apply the chain elevator technology to much a wider range of products. **DB**